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*** *The above List is prepared from the Patent Records by Mr. T. Morgan, Secretary of the Inventors' Patentright Association, Limited.*

SONNET.

On Viewing the Picture of the Countess Gower and the Lady Elizabeth Leveson Gower, by Sir Thomas Lawrence.

Mother and child! — the one, as summer, shed
With all the beauty that a God could give;
Glowing, and giving light to those who live
In her sweet spirit presence!—gently led,
As leads the kine where dainty flowers spread:
When in fair shade the growing shadows weave
More grace in growth as falls the dewy eve,
Or peers the moonlight in the river's bed.

The other, as the spring, amid fair heaven
Blooming, and blessing all beneath the skies:
E'en, as we watch, when fleecy clouds are riven,
Some brilliant star peep out before our eyes!
So pure, so true! thy kindred blood still see
Life in sweet light, and thus commune with ye.

Henry George Hellon,

NEW CUT-OFF FOR STEAM ENGINES.

An improved cut-off has recently been invented by Mr. George H. Cobb, of Palmer, Mass., U.S. In this engine a single slide valve is operated by the joint action of two eccentrics, one of which is secured to the main shaft, while the other moves freely in a longitudinal direction upon the governor shaft, but is prevented from turning thereon by a slot in the eccentric and a feather in the shaft.

The cam or eccentric on the governor shaft is graduated, so that its centre varies in position at every point in its width, the eccentricity passing around from one side of the shaft to the other. The governor acts upon the movable eccentric and varies its position according to the speed of the engine.

The straps of the two eccentrics are connected with a link or lever, which is fulcrumed on the lever that operates the slide valve of the engine, and the governor takes its motion from the main shaft through mitre gearing.

It is a very simple matter to adjust the cut-off to the speed of the engine, the adjustment depending on the relation of the governor arms with the moveable eccentric. This device appears practical; it certainly is very simple, and possesses the advantage of being applicable to engines already in use.

CAST STEEL ARMOUR FOR SHIPS.

The material of which thick armour should be made, says Mr. Barnaby, is now the subject of anxious experiment in Germany and France, as well as in England and Italy. Steel and other alloys of iron are so little known or understood that there is a large field for experiment open for the armour plate maker and for the artillerist. Steel has been tried many times alone, and in combination with iron, but it never gave enough satisfaction to secure its adoption until experiments were made at Spezzia with plates 55 centimetres thick, manufactured by Schneider and Co., at Creuzot. With these the Italian Government were so well pleased that they are plating the Dandolo and Duilio with such plates. Those of us who visited the French Exhibition last year may have seen a steel armour plate produced by this firm, bent to the form of a turret, 32 inches thick, and weighing 65 tons. Those who went to the works at Creuzot, by favour of M. Schneider, may also have seen an ingot of cast steel, suitable for making an armour plate, and weighing 120 tons. The rival firm of Terre Noire exhibited armour plates of steel which had not been hammered, or rolled, or otherwise forged. They were simply cast plates, tempered in oil, and annealed. Judging from the admirable series of specimens and tests and analyses, the manufacture has already attained a large degree of precision, and is full of promise. It is believed that the Italian Government will shortly test some of it with the big Elswick gun, and it may be that blocks of cast steel will revolutionise the manufacture of armour by making the rolling unnecessary, and bring down the cost to that of ordinary large castings. The French Government have also made many experiments with steel armour at Havre, but have not yet satisfied themselves that they should give up wrought iron. Experiments with steel in England have shown that steel can be made of great hardness, so hard that it will break up all projectiles which strike it, and that will not suffer seriously in doing so. Sir Joseph Whitworth has obtained some most remarkable results in this direction, and he is still pursuing the inquiry.

Messrs. Cassell's Serials we are compelled to postpone noticing.

Reviews.

MODERN METEOROLOGY.

"Modern Meteorology: A Series of Six Lectures Delivered under the Auspices of the Meteorological Society in 1878." Illustrated. London: Edward Stanford, 55, Charing-cross, S.W., 1879.

This work has reference to a branch of knowledge which is yet in an infantile state, hence one feels very much difficulty in making any positive statements with regard to it. In fact, the preface of this work states that Meteorology, as it is studied at the present day, may well receive the designation of "modern," and affirms that its renovation dates from the proposal to employ telegraphy in the transmission of meteorological observations, which proposal was realised hardly more than a quarter of a century ago, when observations collected by telegraphy were laid down on charts, new light was thrown upon the complex phenomena included under the simple term "weather;" and by the publication of the charts so prepared the public were admitted to the study of the processes of weather production by the mutual action of cyclones and anticyclones. The diffusion of this knowledge, however, is slow, and it appears the council of the Meteorological Society considered that a set of lectures explanatory of modern views, and showing how the stock of knowledge of an older date may be thereby illustrated, would, in the present condition of the science, be well timed.

Arrangements were made by the council of the Meteorological Society to deliver in the autumn of 1878 the course of lectures which are reproduced in the pages of this work.

The council of the Institution of Civil Engineers graciously lent the use of their theatre for the six evenings, where these lectures were delivered.

A syllabus of these lectures states:—

Lecture I.—"The Physical Properties of the Atmosphere." By Robert James Mann, M.D., F.R.C.S., F.R.A.S., F.R.G.S., V.P.M.S.—Definition and object of meteorological science, Purpose and plan of this course of lectures, Meteorology based on the physical properties of the atmosphere, Invisibility of air, Its weight, Minuteness of particles, The gaseous state, Kinetic theory, Inherent movements of atoms, Compressibility of air, Expansion by heat, Contraction by cold, Influence of gravity upon its condition, The law of Boyle and Mariotte, Pressure increases in same ratio as volume, Regnault's law, The limits of the atmosphere, Highest ascents of balloon, M. Liais' views, Specific gravities of mercury, water, and glycerine, Torricelli's invention of mercurial barometer, Pascal's proof of Torricelli's views, Glycerine barometer of Mr. Jordan, Pressure of air in all directions, The same on all areas of equal size, Relation of area of cistern to area of column of barometer, Pressure in all directions the cause of wind movement, Atmospheric pressure at sea level, Diminution in higher regions of the air, Theoretical depth of a homogeneous atmosphere, Pressure on a square foot and square mile, Weight of the entire atmosphere, Constituent elements of air, Oxygen and nitrogen, Law of gaseous diffusion, Vaporisation of water, Relations of aqueous vapour and atmosphere, Saturation varies with temperature, Capacity of air for aqueous vapour doubled with each increase of 27° of temperature, Elastic force of atmospheric vapour, Determining cause of clouds and rain, Influence of aqueous vapour of the air on the barometer, Influence of evaporation on temperature, Evaporation causes cold, Condensation sets free heat, Warmth promoted by rain, Cause of low temperature of high regions of the air, Limiting temperatures of atmosphere, Diathermancy of dry air, Aqueous vapour acts as a heat screen, Scorching sunshine of mountain tops, Softened character of tropical heat, atmospheric carbonic acid and ammonia, Fixity of constitution of atmosphere, Ozone, a modified condition of oxygen, Transparency of air, Importance of diathermancy and transparency to terrestrial life, The blue sky dependent on atmosphere, Cause of sunset colours.

Lecture II.—"Air Temperature, Its Distribution and Range." By John Knox Laughton, M.A., F.R.A.S., F.R.G.S., F.M.S., Mathematical Instructor and Lecturer in Meteorology at the Royal Naval College, Greenwich.—Importance of climatic knowledge, Air temperature a very important component of climate, Temperature of space, Earth temperature, Sun the source of all heat as affecting climate, Isotherms do not agree with parallels of latitude, Marked instances of this, Isothermal maps, Causes of the disagreement: soil, aspect, shelter, ocean currents; with geographical examples, Heat carrying powers of air, as compared with heat of water, The Sahara submerged, Hot winds: the Swiss Föhn; Arctic observations; the prairies of North America, Cold winds and cold spells, as in Texas, Minnesota, Paraguay, the valley of the Amazon, Our English "blackthorn winter," Effects of moisture or dryness on radiation, Equable and excessive climates, Range of temperature by day and night, summer and winter, Mean *alone* gives little idea of climate: the range and the extremes have a most important influence on animal and vegetable life: grapes in northern Asia, corn in the Hebrides, tropical ferns in Tierra del Fuego, vineyards of the Gironde—Sensations are very incorrect indication of temperature: Arctic experiences; heat at Hong Kong—For scientific comparison exact measurement necessary, Thermometers, Methods of observing, Sun and Shade, Difficulties to be contended with, Different screens, *Thermomètre fronde*, Thermographs, Maximum and minimum, Methods of obtaining means.

Lecture III.—"The Barometer and its Uses, Wind and Storms." By Richard Strachan, F.M.S.—Historical notice of the invention and perfecting of the barometer, Meteorology mainly concerned with standard barometers, Fortin's standard for stations, Kew-pattern marine barometer a standard for use at sea, Gay Lussac's syphon a standard for travellers, Relative merits of these as regards accuracy and permanence of errors, The Kew-pattern barograph, What the barometer has told us, Popular use of, as a weather-glass, The aneroid a substitute for the barometer, Use of, in measuring heights and contouring, Distribution of atmospheric pressure in storms, Average distribution of pressure over the globe, Diurnal range of pressure, Atmospheric pressure correlated to temperature, wind, and weather, Science here evident, though the key to prediction may be wanting.

Lecture IV.—"Clouds and Weather Signs." By the Rev. W. Clement Ley, M.A., F.M.S.—Causes of the small amount of progress hitherto made in this branch of meteorology, No very satisfactory classification of cloud varieties at present exists: the old nomenclature incomplete; but it would be as yet premature to remodel it, Cloud types related to the electrical conditions on the one hand, and on the other to the types of wind and pressure distribution, Probable outlines of a future science of Cloud Laws, Scientific explanations of the best-known prognostics derived from the *shapes*, *colours*, &c., of the clouds, Value of the knowledge obtained from the *movements* of the clouds, Relation of indications derived from the clouds and from weather charts, Value of the less-known weather signs dependent on this relation, Special instances of the application of this study in the actual conditions of particular days, Method and limits of this kind of weather forecasting.

Lecture V.—"Rain, Snow, Hail, and Atmospheric Electricity." By George James Symons, F.R.S., Hon. Sec. M.S.—Rain: What it is, Where it comes from, Why it falls, How it is measured, Different patterns of rain gauges, Best size, shape, pattern, and material for rain gauges, Mechanical gauges, Storm gauges, Necessity for inspecting rain gauge stations, Collection of rainfall statistics, Applications of rainfall data to practical life, Drainage, Flood warning, Waterworks, Salmon catching, Sugar making, Effect of altitude on rainfall, Details of mean fall in British Isles and at some foreign stations, Seasonable distribution, Daily fall, Storm rains, Secular variation. Snow: What it is, How it is measured, Its beautiful crystallisation, and how to observe it. Hail: What it is, Some of its forms, Noise before it falls, Rarity at night. Atmospheric Electricity: Thunder-storms, Lightning conductors,

Lecture VI.—"The Nature, Methods, and General Objects of Meteorology." By Robert H. Scott, M.A., F.R.S., F.G.S., For. Sec. M.S., Secretary to the Meteorological Council.—Meteorology the science of the atmosphere, and therefore under great disadvantages as compared with astronomy, Stations must be multiplied to eliminate effect of local conditions, Observations must be continued for a long time to confer any value on results derived from them, Meteorology demands the knowledge of many other sciences, especially chemistry and physics, Determination of the amount of moisture deposited from the atmosphere, and available on the earth for mechanical work, an immediate point of contact between meteorology and practical engineering, &c. Determination of the temperature, pressure, and motion of the air, as well as of the changes in its constitution produced by the variations in the amount and condition of the aqueous vapour, Difficulties from the impossibility of extending the sphere of observations to an appreciable extent above the surface of the earth. Objects of meteorology almost countless, Air and its condition, Its influence on health, the growth of crops, Value of attaining the slightest approach to a knowledge of what the weather will be for even a week in advance, not only to the individual, but to the country and to the world at large, Climatology as affecting the choice of colonies, and what products to expect from them, Sanitary meteorology shows under what conditions life can best be prolonged and health maintained.

Those who take much interest in meteorology should get this work, as we can safely say that its perusal will afford them profit and pleasure.

TYNDALL'S FRAGMENTARY SCIENCE.

"Fragments of Science, a Series of Detached Essays, Addresses, and Reviews." By John Tyndall, F.R.S. Sixth edition. 2 vols. Longmans, Green, and Co. 1879.

This being the sixth edition of a work by so eminent a scientific man as Professor Tyndall, the critic's task cannot be any other than an easy one. In fact, the best course to adopt appears to us to lay before our readers the following prefatory statements of this new edition:—

To avoid unwieldiness of bulk this edition of the "Fragments" is published in two volumes, instead of, as heretofore, in one.

The first volume deals almost exclusively with the laws and phenomena of matter. The second trenches upon questions in which the phenomena of matter interlace more or less with those of mind.

New essays have been added, while old ones have been revised, and in part recast. To be clear, without being superficial, has been the aim throughout.

In neither volume have I, says Prof. Tyndall, aspired to sit in the seat of the scornful, but rather to treat the questions touched upon with a tolerance, if not a reverence, befitting their difficulty and weight.

Holding, as I do, the nebular hypothesis, I am logically bound to deduce the life of the world from forces inherent in the nebula. With this view, which is set forth in the second volume, it seemed but fair to associate the reasons which cause me to conclude that every attempt made in our day to generate life independently of antecedent life has utterly broken down,

A discourse on the electric light winds up the second volume. The incongruity of its position is to be referred to the lateness of its delivery.

We may add that after examination of the work that these statements are fully borne out by the context of the book, and that this sixth edition renders the work still more valuable than before.

THE REPORT ON ELECTRIC LIGHTING.

THE Select Committee of the House of Commons appointed "to consider whether it is desirable to authorise municipal corporations or other local authorities to adopt any schemes for lighting by electricity, and to consider how far, and under what conditions, if at all, gas or other public companies should be authorised to supply light by electricity," have agreed to the following report:—

"The general nature of the electric light has been well explained in the evidence of Professor Tyndall, Sir William Thomson, Dr. Siemens, Dr. Hopkinson, and others. It is an evolution of scientific discovery which has been in active progress during the whole of this century. Essentially the electric light is produced by the transformation of energy either through chemical or mechanical means. The energy may be derived from a natural force, as for instance, a waterfall, or through combustion of a material in the cells of a voltaic battery, or of fuel in a furnace. The energy being converted into an electric current may be used to manifest electric light by passing between carbon points or by rendering incandescent solid bodies, such as idirium. A remarkable feature of the electric light is that it produces a transformation of energy in a singularly complete manner. Thus the energy of one-horse power may be converted into gaslight, and yields a luminosity equal to 12-candle power. But the same amount of energy transformed into electric light produces 1,600-candle power. It is not therefore, surprising that while many practical witnesses see serious difficulties in the speedy adaptation of the electric light to useful purposes of illumination, the scientific witnesses see in this economy of force the means of great industrial development, and believe that in the future it is destined to take a leading part in public and private illumination. There is one point on which all witnesses concurred, that its use would produce little of that vitiated air which is largely formed by the products of combustion of ordinary illuminants.

"Scientific witnesses also considered that in the future the electric current might be extensively used to transmit power as well as light to considerable distances, so that the power applied to mechanical purposes during the day might be made available for light during the night. Your committee only mention these opinions as showing the importance of allowing full development to a practical application of electricity, which is believed by competent witnesses to have future important bearings on industry.

"So far as the practical application of the electric light has already gone, there seems to be no reason to doubt that it has established itself for lighthouse illumination, and is fitted to illumine large symmetrical places, such as squares, public halls, railway stations, and workshops. It is used in Paris for lighting shops which require a light by which different colours may be distinguished, and has recently been used in England for the same purpose with satisfactory results. Many trials have been made for street illlumination with greater or less success.

"Compared with gas the economy for equal illumination does not yet appear to be conclusively established. Although in some cases the relative economy for equal candle-power is on the side of the electric light, yet in other cases gas illumination of equal intensity has the advantage. Unquestionably the electric light has not made that progress which would enable it in its present condition to enter into general competition with gas for the ordinary purposes of domestic supply. In large establishments the motors necessary to produce the electric light may be readily provided, but so far as we have received evidence, no system of central origin and distribution suitable to houses of moderate size has hitherto been established.

"In considering how far the Legislature should intervene in the present condition of electric lighting, your committee would observe generally that in a system which is developing with remarkable rapidity, it would be lamentable if there were any legislative restrictions calculated to interfere with that development. Your committee, however, are not in a position to make recommendations for conditions which may hereafter arise, but at present do not exist, as to the distribution of electric currents for lighting private houses from a central source of power. No legislative powers are required to enable large establishments, such as theatres, halls, or workshops, to generate electricity for their own use.

"If corporations and other local authorities have not power under existing statutes to take up streets and lay wires for street lighting or other public uses of the electric light, your committee think that ample power should be given them for this purpose. There seems to be some conflict of evidence as to whether the existing powers are sufficient or not. But even in regard to local authorities it would be necessary to impose restrictions upon placing the wires too near the telegraph wires used by the Post Office, as the transmitting power of the latter would be injuriously affected by the too close proximity of the powerful electric currents needed for producing light.

"Gas companies, in the opinion of your committee, have no special claims to be considered as the future distributors of electric light. They possess no monopoly of lighting public streets or private houses beyond that which is given to them by their power of laying pipes in streets. Electric light committed to their care might have a slow development. Besides, though gas companies are likely to benefit by the supply of gas to gas-engines, which are well suited as machines for producing electric light, the general process of gas manufacture and supply are quite unlike those needed for the production of electricity as a motor or illuminant.

"Your committee, however, do not consider that the time has yet arrived to give general powers to private electric companies to break up the street, unless by consent of the local authorities. It is, however, desirable that local authorities should have power to give facilities to companies or private individuals to conduct experiments. When the progress of invention brings a demand for facilities to transmit electricity as a source of power and light from a common centre for manufacturing and domestic purposes, then, no doubt, the public must receive compensating advantages for a monopoly of the use of the streets. As the time for this has not arrived, your committee do not enter into this subject further in detail than to say that in such a case it might be expedient to give to the municipal authority a preference during a limited period to control the distribution and use of the electric light, and, failing their acceptance of such a preference, that any monopoly given to a private company should be restricted to the short period required to remunerate them for the undertaking, with a reversionary right in the municipal authority to purchase the plant and machinery on easy terms. But, at the present time, your committee do not consider that any further specific recommendation is necessary than that the local authorities should have full powers to use the electric light for purposes of public illumination; and that the Legislature should show its willingness, when the demand arises, to give all reasonable powers for the full development of electricity as a source of power and light."

Dr. Lyon Playfair was the chairman of the committee, and his draft report was adopted.

PRESERVATION OF WOOD AND SEED CORN.

OUR attention has been called to the plumbic process for the preservation of wood and seed corn, shown by Messrs. Descalonne and Co. at the Paris Exhibition last year. Although this preservative quality of plumbic salts is no novelty to scientific chemists, yet their general introduction commercially for this process is decidedly noteworthy. All the processes hitherto employed for the preservation of wood are costly, difficult—if not dangerous—and do not fully secure the end in view. Messrs. Descalonne have adopted a tarry tribasic salt, which is considered to be free from the defects of the various solutions of salts hitherto employed for the preservation of wood, &c. The action is stated to be that immediately it is injected it forms an insoluble combination of great solidity, and transforms into imputrescible metallic salt everything in the wood that contains the elements of decomposition. This plumbic solution not only completely guards the wood from the attacks of insects and vegetable parasites, but gives to it a hardness and strength which considerably increases its durability, besides preventing it from warping, swelling, or cracking. Finally, this capital invention, so far from altering the colour of the wood or giving it any odour whatever, renders it fit to receive varnish, paint, size, &c., and to be used for the most delicate work. The importance of a preparation of this kind is immense to all industries employing wood, particularly engineers, architects, trellis-makers, joiners, hop growers, &c. But, perhaps, for naval purposes, railway sleepers, telegraph posts, and wood pavings, it will be the most valuable. We understand that the Northern Railway Company of France have made a decisive experiment, by laying down 6,000 sleepers prepared with this solution; and there can be no doubt that this invention is worthy of the attention of all who seek to provide for the preservation of wood, &c.

The same firm also exhibited another plumbic solution for dressing corn and seed of all kinds so as to protect the crops from the ravages of mildew, smut, and ergot. The *Journal de l'Agriculture* says that the lead dressing exercises a most favourable action in hastening the germination of seeds, and many experiments have demonstrated its superiority to sulphate of copper, and it is considered that this dressing will be equally efficacious with root crops, vegetables, and flowers, as with wheat, rye, barley, and other cereals.

We are pleased to find that an invention of so much promise is in the hands of so competent a party as Mr. Camille Espir, the gentleman whose substitute for gunpowder for blasting purposes, &c., we noticed in our columns some time ago. He is, it appears, in possession of the sole right to the English patent.

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THE SESSION 1878—1879

[*Is Ended.*

N.B.—The Balance Sheet, 1879, can now be inspected.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts.

F. W. CAMPIN, Sec.

Proceedings of the Institute.

EXECUTIVE COUNCIL.

ON 5th of June a meeting of the Executive Council took place, Mr. T. Paterson presiding. After confirmation of minutes of the last meeting the secretary presented the usual monthly Balance Sheets and Report as to new members.

The secretary then reported that in pursuance of the suggestion made at the Annual General Meeting, that there should be a deputation to the Attorney-General on the subject of the Government Patent Bill, he had invited various working men known for their advocacy of public questions to come to the Members' Meeting to be held on the same evening, to confer with the Institute, and if so decided to take joint action with the Institute, and form part of any deputation.

MEMBERS' MEETING.

The meeting on 5th June was therefore a conference, Messrs. George Howell, H. Broadhurst, S. Brighty, M. Sinclair, and others, attending as representative working men, and after fully considering the various clauses of the Government Bill, it was agreed that application should be made to the Attorney-General to receive a deputation on the subject.

Monthly Notices.

The death of Mr. W. Froude, F.R.S., the eminent mathematician, is announced.

For detecting fire-damp in mines, MM. Mailland and Le Chatelier brought a new method before the Académie des Sciences of Paris last month. They propose the use of a lamp burning hydrogen, the feeble light of which would not mask the blue flame produced by fire-damp within the gauze of safety lamps. A proportion of light carburetted hydrogen as low as 0·25 per cent is said to be easily recognised by their arrangement.

Prof. Galloway's case is attracting close attention. After twenty-three years' service in the Royal College for Science for Ireland he has been dismissed by the Department of Science and Art. A petition is being signed by the citizens of Dublin praying the House of Commons to order an inquiry into this matter.

The Académie des Sciences has elected M. Oppolzer as correspondent for the section of Astronomy, in the place of M. Argelander; and M. Alphonse Favre as correspondent for the section of Mineralogy, to replace M. Leymerie. Mr. MacCormack has been elected a correspondent in the section of Rural Economy, in place of M. Chevandier de Valdrome, and Prof. Huxley, in place of Baer, in the section of Anatomy and Zoology.

The sensibility of Selenium charged with an electric current to the influence of light is tolerably well known. The *Scientific American* informs us that Mr. Carey, of Boston, Mass., has devised a camera, into the construction of which a bar of selenium enters, which he calls a telelectroscope. It will receive the image of a sitter at New York and produce the photographic impression at Boston.

Prof. Stokes, of Cambridge, has received from the Emperor of Germany the dignity of Foreign Chevalier of the order Pour le Mérite in recognition of his scientific labours.

A new malady, which attacks the Rubiaceæ order of plants grown in hothouses, has been detected by M. Max Cornu. It appears that an Anguillula deposits its eggs in the roots, these swell and decay, the plant perishing rapidly. Precipitated sulphur has been recommended as an effective remedy.

Signor Toselli, a well-known mathematician, has just died in Paris, where he had settled as a teacher. He was the inventor of the "loupe marine," a kind of diving-bell. During the defence of Venice in 1848 Toselli acted as secretary to Manin.

Localisation of Arsenic in the Brain.—According to MM. Caillol de Poncy and Livon arsenic seems to be substituted for the phosphorus of phospho-glyceric acid, thus producing an arsenio-glyceric acid. Lecithin then is modified so as to contain arsenic in place of phosphorus.

American Association for the Advancement of Science.—The twenty-eighth meeting of this Association will be held at Saratoga, N.Y., commencing on Wednesday, August 27, 1879. The following is a list of the Officers of the Saratoga Meeting:—President, George F. Barker, of Philadelphia; Vice-President, Section A, S. P. Langley, of Alleghany; Vice-President, Section B, J. W. Powell, of Washington; Chairman of Permanent Subsection of Chemistry, Ira Remsen, Baltimore; Chairman of Permanent Subsection of Microscopy, Edward W. Morley, of Hudson; Permanent Secretary, F. W. Putnam, of Cambridge; General Secretary, George Little of Atlanta; Secretary of Section A, John K. Rees, of St. Louis; Secretary of Section B, A. G. Wetherby, of Cincinnati; Treasurer, William S. Vaux, of Philadelphia.

In a paper on Amber M. Helm says that in entire fragments it is permeable in water. It contains as much as 4 per cent of sulphur in the state of organic combination. This sulphur has probably been absorbed by the fossil resin in the state of hydrogen sulphide subsequent to its formation. The author describes another fossil resin, gedanite, which differs from amber by containing a smaller proportion of oxygen, and is softer, more fusible, and more soluble in ether. It is free from succinic acid.

The Scientific Review.

JULY, 1879.

PARLIAMENT AND ELECTRIC LIGHTING.

"A curious people and a wondrous place" was the utterance of a poet with regard to our great Metropolis. It will equally well apply to our House of Commons, where one finds those who can supply the public with no end of "tall talk," also those whose talk is very small indeed. And as with regard to talk so with ideas. Further, in the matter of action, the proceedings of this legislative body are so difficult of comprehension that one cannot understand what are the guiding principles which regulate the movements of the people's house of legislation.

By thus giving publicity to these views the Scientific Review may possibly, for the first time, be charged with taking up with political subjects. Still, we have the justification that the reference thereto arises simply from our earnest interest in the advancement of practical science and industrial improvement. For what can be more curious and wonderful, and, as we conceive, objectionable, than the course of proceedings of our legislature that puts aside a grave question like the Patent Law, which, as even its opponents say, is *important*, as being highly prejudicial to the successful maintenance of our arts and manufactures, whilst this law is affirmed by Inventors and others to operate as the great *primum mobile* of our industrial progress, Patent Law reformation having for several years past been brought forward and dangled in Parliament like a ragman's doll before the eyes of the passers-by, whilst all sorts of mere vestryman's questions—such as Omnibus Regulation Bills, to prevent some fat old squire being too much squeezed *in transitu*—are being treated as the serious matters of business of the British Legislature.

Although we have given vent to these strictures on our legislature in reference to the Patent laws, which, as far as we can judge, are buried for this Session, we desire just now to direct the attention of our readers to a different matter, namely, the Report of the Committee of the House of Commons on Electric Lighting, the tenor of which evinces such a desire to delay the practical advancement of this new system of lighting, as can only be accounted for by the fact that a number approaching *one-half of the Members of the House of Commons* are said to be holders of shares in Gas and Water Companies, and that Metropolitan Gas and Water are sympathetic. This Report was agreed upon, notwithstanding the evidence of many important witnesses, amongst others Sir William Thomson, of whom the *Times*, from which we now quote, truly says, his scientific attainments entitle his opinions to the most respectful consideration, even when they seem to be at variance with those of other recognised authorities, who not only speaks of the economy of the electric light as a matter which is beyond the domain of controversy, but also expresses his belief that this light must be taken into general use at an early period. He looks forward to the employment of electricity not only as an illuminating agent, but also as a source of motive power; and he points to some hitherto unutilised phenomena of nature as agencies which can be rendered subservient to the production of this power in practically unlimited quantities. The Falls of Niagara, he tells the Committee, may be made to drive dynamic machines, and conductors may be employed to transmit force from these machines to places where either illumination or the development of mechanical power is wanted. By the adoption of such contrivances he believes that the Falls will ultimately become the chief source of light and of mechanical power over a large area of North America; for electricity produced in the manner described might be conveyed for hundreds of miles, and the manufactories of whole towns might be set in motion by it. If this indeed be so, it seems to follow that the advantage given to America by the Falls would be apparent rather than real; for it is manifest that the ebb and flow of the tides, or the force of the winds, might in like manner be rendered available; and it even seems probable, especially if some moderately economical method of storing force for use during periods of calm can be devised, that windmills near the places where light or power is required will be more profitable than the employment of copper conductors many miles in length. In either event, the prediction of Sir William Thomson, if realised, will enable manufacturing communities to regard the increasing consumption of coal, and the corresponding increase in its cost as it is obtained from deeper and deeper workings, with comparative equanimity. The mineral which was once so precious as a source of economy in manufacture bids fair to be degraded to an inferior and unimportant position.

Furthermore, it is rumoured that a very distinguish chemist, who has already given proofs of his skill and resource in other departments of industry, is prepared to diminish the cost of the production of coal-gas by one-half, coincidently with a great increase in its illuminating power, but that he holds his hand until the pressure of threatened competition becomes sufficiently strong to compel the existing companies to seek his assistance. The spurt of better gas lighting which has lately been exhibited in Regent Street and in the Waterloo Road is supposed to be an indication that the Companies are preparing to deal better with their customers in the future than they have done in the past; but, even from this point of view, it has been of little practical value. The arrangements employed were such as to produce a temperature which would prove speedily destructive to the metal parts of the burners, and which, therefore, would entail a periodically recurring and very considerable increase of expense, over and above the mere improvement in the quality of the gas and the increase in the quantity consumed, which were at first put forward as furnishing sufficient *data* for a comparison between this and other methods of illumination. An improvement of more reality and of greater promise has for some little time been exhibited at the east or dining-room end of the Westminster Aquarium, where five hundred gas burners of the old character have been replaced by two hundred new ones, which afford a light something like double that of their predecessors and of a more pleasant and sun-like quality. This improvement is effected by introducing into the gas, near the burner, the vapour of volatilised naphthaline, a hydro-carbon which is contained by freshly made and warm gas in considerable quantities, but which is deposited in a solid form as the temperature falls. Up to this time naphthaline has been one of the few substances for which no employment could be found in the arts; and both gas manufacturers, who have to remove it as it is deposited in the mains, and the distillers of tar, who obtain it in large quantities, have looked upon it as a mere nuisance. It is now apparent that a material addition to the illuminating power of gas can be obtained by the restoration of this substance in such a manner that it is burnt before it can be again deposited; and it is said that the saving produced by the new lights in the Aquarium, when the whole building is supplied with them, will be as much as £1500 a year. The practical difficulties which may possibly impede the general employment of naphthaline in domestic lighting can hardly be said to be ascertained; but the experiments hitherto made suffice to show that the methods of illumination with which electricity threatens to compete are not themselves likely to stand still, and that the present cost of gas lighting furnishes no certain criterion of what it may presently become. In these circumstances it seems to us that the House of Commons has by its Report simply avoided giving a definitive decision on a matter which it was highly desirable should be placed on a more practical basis.

Proceedings of Societies.

ROYAL SOCIETY.

May 8th.—The President (followed by Lord Lindsay, V.P.) in the chair. The following papers were read: "On the Sensitive State of Electrical Discharges through Rarefied Gases," by the President and Mr. F. J. Moulton; "On the Action of Solid Nuclei," by Mr. C. Tomlinson; "On the Results of the Magnetical Observations made by the Officers of the Arctic Expedition, 1875-76," by Staff-Commander Creak, R.N.; and "On the Relation between the Diurnal Range of Magnetic Declination and Horizontal Force as observed at the Royal Observatory, Greenwich, during the Years 1841 to 1877, and the Period of Solar Spot Frequency," by Mr. W. Ellis.

May 29th. — W. Spottiswoode, Esq., President, in the chair.—The following papers were read: "On the Conduction of Heat in Ellipsoids of Revolution," by Prof. Niven; "On a new Method of Investigating the Magnetic Lines of Force in Magnets, demonstrating the Obliquity of the Equator and Axis of Bar Magnets," by Dr. Shettle; "Preliminary Report to the Committee on Solar Physics on a Method of Detecting the Unknown Inequalities of a Series of Observations," by Messrs. B. Stewart and W. Dodgson; "Researches on Explosives, No. II. Fired Gunpowder," by Capt. Noble and Mr. F. A. Abel"; and "Note on the Spectrum of Sodium," by Mr. J. N. Lockyer.

INSTITUTE OF BRITISH ARCHITECTS.

May 5th.—Annual General Meeting.—C. Barry, Esq., President, in the chair.—The report of the Council and balance-sheets were read and received. The following gentlemen were elected officers for the ensuing year: President, J. Whichcord; Vice-Presidents, T. H. Lewis, H. Jones, and E. M. Barry; Council, J. M. Anderson, A. W. Blomfield, D. Brandon, A. Cates, E. Christian, J. Clarke, H. Currey, J. Gibson, O. Hansard, J. Honeyman, E. I'Anson, J. L. Pearson, G. Vulliamy, A. Waterhouse, and T. Worthington; Hon. Secretary, T. H. Wyatt; Secretary, W. H. White.

ASTRONOMICAL SOCIETY.

May 9th.—Lord Lindsay, M.P., President, in the chair.—Capt. E. Barnes, the Rev. W. C. Bruce, Messrs. G. T. Gwilliam, J. P. Hartree, C. A. Jenkins, and W. E. Plummer were elected Fellows. Mr. Christie read a paper "On Spectroscopic Observations of Drorsen's Comet," which he had made at the Royal Observatory, Greenwich, when Brorsen's comet came to perihelion in 1868. Dr. Huggins had examined its spectrum and found it to consist of three bands which he identitied with one of the spectra of carbon. On the present return to perihelion the spectrum has been examined by Prof. Young and Mr. Christie, and the one finds it correspond with the spectrum of carbon as given in the blue parts of the Bunsen burner, while the other finds it correspond with the spectrum of carbon given by carbon oxide and alcohol vapour. Dr. Schuster thought that the dispersion used was not sufficient to prove the coincidence between the cometary and carbon spectra, and he instanced several other spectra which with small dispersions might easily be confused with the three-band spectrum of carbon. Mr. Inwards exhibited a model of an observing-chair, suitable for use with a transit instrument; and Mr. Neison showed a drawing of the new crater near Hyginus, which had been observed by himself and Mr. N. Green. The following papers were also laid on the table and partly read: "Observations of Brorsen's Comet, February, 1879," by Mr. J. Tebbutt; "Meteor Radiant Points of April 9th-12th, and Catalogue of 222 Stationary Meteors," by Mr. W. F. Denning; "Observations of Brorsen's Comet," by Mr. H. C. Russell; "Observations of Brorsen's Comet, by Lord Lindsay; "Two Short and Easy Methods of Correcting Lunar Distances," by Mr. J. J. Astrand; "Note on Sir J. Herschel's Reference Catalogue of Multiple and Double Stars," by Prof. C. Pritchard; On the Determination of the Solar Parallax from the Parallactic Inequality in the Moon's Longitude, and on the Correction to Hansen's Co-efficient of the Annual Equation," by Mr. E. Neison; and "Order of Publication of Successive Volumes of the 'Observations de Pulkova," by M. O. von Struve.

ZOOLOGICAL SOCIETY.

May 6th.—Prof. W. H. Flower, President, in the chair.—The Secretary read a report on the additions that had been made to the Society's menagerie during April, and called special attention to two Lanceolated Jays (*Garrulus lanceolatus*) from the Himalayas, and two Siberian Roe Deer received in exchange. The Secretary also announced the arrival of a Japanese Goat-Antelope (*Capricornus crispus*), and of an Alpine Accentor (*Accentor Alpinus*), being, it was believed, the first example of this little bird seen in captivity. Prof. Flower exhibited a drawing of a British Cetacean (*Delphinus tursio*), taken from a specimen captured near Holyhead in 1878. Letters and papers were read: from Mr. E. L. Layard, on the localities of certain species of Fruit-Pigeons (Ptilopus) of the South Pacific Islands; from Mr. G. Krefft, giving the description of a supposed new form of insectivorous Bat, of which a specimen had been obtained on the Wilson River, Central Queensland; by Canon Tristram, on a new species of woodpecker, from the Island of Tyzu Sima, near Japan, which he proposed to name after its discoverer, *Dryocopus Richardsi*; from Mr. F. Moore, on new genera and species of Asiatic Lepidoptera Heterocera: eleven new genera were characterised and ninety new species described; by Mr. G. F. Angas, on ten new species of shell of the genera Axinæa and Pectunculus; from Mr. W. A. Forbes, on the anatomy of the African elephant, based on the facts observed during a dissection of a young female of that species during the last winter; and by Mr. F. J. Bell, on the question of the number of anal plates in the Echinoderms of the genus Echinocidaris.

May 20th.—Prof. W. H. Flower, President, in the chair.—Mr. Sclater called attention to several animals observed by him during a recent visit to some of the Zoological Gardens on the Continent. Papers and communications were read by Prof. Owen, on a portion of the mandible of a large extinct Kangaroo, proposed to be called *Palorchestes crassus*, from the ancient fluviatile drift of Queensland; from Mr. M. Jacoby, containing descriptions of new species of Coleoptera of the family Halticidæ; by Mr. Sclater, the fourth of a series of papers on Birds collected by the Rev. George Brown on Duke of York Island, and on the neighbouring parts of New Britain and New Ireland: the present collection contained fifty-nine specimens, belonging to forty-two species, of which several were believed to be new to science; from Prof. Garrod, on the anatomy of the Gelada Baboon (*Gelada Rueppelli*), based on the examination of a specimen that had died in the Society's Gardens: Prof. Garrod came to the conclusion that Gelada must be considered as a distinct generic form, more nearly allied to Cercopithecus than to Cynocephalus; and by Lieut.-Col. Godwin-Austen, on the female of *Ceriornis Blythi*, Jerdon.

June 3rd.—Prof. W. H. Flower, President, in the chair.—The Secretary exhibited and made remarks upon two volumes of original drawings of the Birds of India, which had been deposited in the Society's Library by Brigadier-General A. C. M'Master. He also exhibited and made remarks on a small collection of birds forwarded to him by Dr. A. Döring, of the University of Cordova, in the Argentine Republic. Mr. W. Ottley gave a description of the blood-vessels of the neck and head of the Ground Hornbill. Papers and letters were read: by Mr. E. R. Alston "On the Specific Identity of the British Martens," in which he pointed out the distinguishing character of *Martes sylvatica* and *M. foina*, and showed that the former species only is found in this country; by Messrs. Sclater and Salvin on the birds collected by the late Mr. T. K. Salmon in the State of Antioquia, United States of Columbia; and by Mr. G. F. Angas on the land-shells collected by the late Dr. W. M. Gabb in Costa Rica. The collection was stated to contain examples of forty-two species, of which ten or twelve were believed to be new to science.

GEOLOGICAL SOCIETY.

May 28th.—H. Clifton Sorby, Esq., President, in the chair.—The following communications were read: "On the Endothiodont Reptilia, with Evidence of the Species *Endothiodon uniseries*, Owen," by Prof. R. Owen; "Note (Third) on Eucamerotus, Hulke, Ornithopsis, Seeley = *Bothriospondylus magnus*, Owen = *Chrondrosteosaurus magnus*, Owen," Mr. J. W. Hulke; "Description of the Species of the Ostracodous Genus Bairdia, M'Coy, from the Carboniferous Strata of Great Britain," by Prof. T. R. Jones and Mr. J. W. Kirkby; "Report on a Collection of Fossils from the Bowen River Coal-field and the Limestone of the Fanning River, North Queensland," by Mr. R. Etheridge, jun.; "On a Fossil Squilla from the London Clay of Highgate, part of the Wetherell Collection in the British Museum," "On *Neeroscilla Wilsoni*, a supposed Stomatopod Crustacean from the Middle Coal-Measures, Cossall, near Ilkeston, Derbyshire," "On the Discovery of a Fossil Squilla in the Cretaceous Deposits of Hâkel, in the Lebanon," and "On the Occurrence of a Fossil King-Crab (Limulus) in the Cretaceous Formation of the Lebanon," by Dr. H. Woodward.

SOCIETY OF ANTIQUARIES.

May 29th.—E. Freshfield, Esq., in the chair.—The City Lands Committee of the Corporation of London presented a memorial medallion of Temple Bar, struck from the old lead removed from the roof. Mr. J. D. Leader communicated some particulars respecting the discovery, in the year 1761, of some well-known Roman Tabulæ Honestæ Missionis, which were found at the Lawns, in Reveling, near Stannington, not far from Sheffield. See Hübner, "Inscript. Rom. Brit.," p. 218. Mr. J. E. Nightingale exhibited a silver chalice, probably of the thirteenth century, and a paten of the fifteenth century belonging to the church of Berwick St. James, Wilts. Mr. E. C. Robins exhibited the "casing-plates" of the lock of a curious chest belonging to the Dyers' Company, which he further illustrated by drawings and photographs of other chests of a like character. The workmanship of these plates was highly ornamented and of very elaborate finish, and considerable discussion ensued as to whether the work was German, Flemish, or Italian. Mrs. Everett exhibited a necklet and earrings composed of antique intagli gems in plasma, set in a modern mounting. Mr. F. C. Penrose communicated an account of the recent discoveries of portions of Old St. Paul's. This paper was of great interest, and bore ample testimony to the sagacity with which the distinguished surveyor of the fabric had in progress of the excavations detected error after error in the extant plan of Old St. Paul's, until at last, by a careful process of induction, he was able step by step to discover the test-points which enabled him not only to set out the correct plan, but also the true site of St.

Paul's Cross. The paper was profusely illustrated by plans and drawings. It appeared that the axis of Old St. Paul's intersected the axis of the present building just under the centre of the dome.

ROYAL INSTITUTION.

JUNE 2ND.—G. Busk, Esq., Treas. and V.P., in the chair.—Miss Lucy Bligh, Lieut.-Col. C. A. M'Mahon, Messrs. Fung-Yee, L. Gye, and J. Mason were elected Members.

INSTITUTION OF CIVIL ENGINEERS.

MAY 27TH.—Mr. Bateman, President, in the chair.—The monthly ballot resulted in the election of twenty-seven candidates, viz.: Messrs. D. W. Campbell, C. S. Fahey, A. B. W. Kennedy, and B. Sykes as Members; Messrs. G. R. Bodmer, W. S. Boult, F. L. Brown, A. J. D. Cameron, J. Crosbie, A. J. Goldsmith, J. R. Haines, T. H. Harrison, S. Horsley, J. C. Hudson, A. C. Hurtzig, A. M'Gregor, E. A. Parsick, J. J. Potts, A. E. Preston, T. A. Skilliter, H. R. Smith, A. Wallace, and S. R. Wilkes as Associate Members; and Messrs. A. T. Hawkins, G. E. Moberly, J. Morris, and R. Warner as Associates. The paper read was "On Dock Gates," by Mr. A. F. Blandy.

HISTORICAL SOCIETY.

MAY 8TH.—James Haywood, Esq., F.R.S., in the chair.—Seven ordinary members were admitted. Mr. C. Walford read a paper entitled "Early Laws and Customs in Great Britain respecting Food." Dr. Zerffi read Part IV. of his paper on the "Historical Development of Idealism and Realism, with special Reference to Descartes, Spinoza, and John Locke." The Secretary intimated that the Council had resolved to issue the "Transactions" in quarterly parts, and therewith to publish the Society's "Proceedings." The "Proceedings" would embrace the discussions at the monthly meetings, notices of new and important historical works, and notes of intercommunication by the members on points of historical interest.

PHYSICAL SOCIETY.

MAY 10TH.—Prof. W. G. Adams in the chair.—Mr. J. K. Evans was elected a member. Mr. Wollaston explained the construction of Gower's improved form of Bell's speaking telephone. Prof. W. F. Barrett gave an account of some attempts which he had made to overcome the induction clamour on telephones caused by the ordinary telegraph currents on neighbouring wires. Mr. Wilson read a paper "On the Divisibility of the Electric Light by Incandescence." Dr. Coffin exhibited a Trouvé Polyscope, which consists of a small hand incandescent platinum-wire electric light, designed for illuminating the more inaccessible cavities of the body in surgical examinations.

MAY 24TH.—Prof. W. G. Adams in the chair.—Mr. Taylor, M.A., and Mr. W. Emmott were elected Members. Prof. Hughes explained his new induction balance, and showed some of its principal effects. Mr. C. Roberts gave some results which he had obtained from an examination of certain alloys by means of the induction balance. Dr. Erck exhibited his novel pump for lifting solutions out of batteries.

SOCIETY OF BIBLICAL ARCHÆOLOGY.

MAY 6TH.—Dr. S. Birch, President, in the chair.—The following were submitted for election as members: Rev. J. Anderson, Rev. C. A. Berry, Mr. T. J. Leeming, Prof. W. Sloane, and Mr. R. P. Stuart.—The following papers were read: "Notes on Vegetable Remains from the Egyptian Tombs," by Mr. J. R. Jackson; and "The Talmud in Relation to Biblical Archæology," by the Rev. J. Miller.

JUNE 10TH.—Dr. S. Birch, President, in the chair.—The following communication were read: "On the Abyssian or Æthiopic Book of Baruch," by the Rev. J. M. Rodwell; "On the Egyptian Documents relating to the Statues of the Dead," by Mr. M. G. Maspero; and "Early Semitic Inscriptions from Babylonia," by Mr. W. St. C. Boscawen.

GEOGRAPHICAL SOCIETY.

MAY 26TH.—Anniversary Meeting.—Sir R. Alcock, V.P., in the chair.—The following gentlemen were elected Fellows: Sir J. A. Hanham, Sir S. Wilson, Col. E. H. Clive, Rev. R. Eden, Messrs. E. J. Bartlett, A. C. Cole, S. Green, J. A. H. Louis, H. C. Luck, and S. E. Peal. The Royal (Patron's) Medal for the encouragement of geographical science and discovery was awarded to Col. N. Prejevalsky, for his successive expeditions in the years 1870-3 to Mongolia and the high plateau of Northern Tibet, in the course of which he made a route-survey of 3,500 miles of previously unexplored country; also for his journey from Kulja to Lob-Nor in 1876-7, and for the admirable manner in which he has described these regions and their products in the published narratives of his travels. The Founder's Medal was awarded to Capt. W. J. Gill for the important geographical work he has performed during two long journeys of exploration, voluntarily undertaken, along the northern frontier of Persia in 1873, and in Western China and Tibet in 1877; and especially for the traverse-survey made by him during the latter journey, and the very complete maps of his route, in forty-two sheets, on a scale of two miles to the inch. The annual Geographical Medals offered by the society to the chief public schools were then presented to the following successful competitors:—Physical Geography: Gold Medal, M. G. Grant, Liverpool College; Silver Medal, F. T. Sharpe, Liverpool College. Political Geography: Gold Medal, D. Bowie, Dulwich College; Silver Medal, C. L. Bicknell, Harrow School. It was announced that the subject for the examination in 1880, both in physical and political geography, would be "Western Africa, from the Sahara to the Congo and Eastwards as far as Nyangwé." The following gentlemen were elected as Council and officers for 1879 80: President, Right Hon. the Earl of Northbrook; Ex-Presidents, Sir R. Alcock and Major-General Sir H. C. Rawlinson; Vice-Presidents, Sir H. Barkly, Capt. F. J. O. Evans, F Galton, and Admiral Sir A. Milne; Treasurer, R. T. Cocks; Trustees, Lord Houghton and Sir J. Lubbock; Secretaries, C. R. Markham and R. H. Major; Foreign Secretary, Lord A. Russell; Councillors, Hon. G. C. Brodrick, Right Hon. Lord Cottesloe, R. N. Cust, Sir B. H. Ellis, J. Fergusson, Sir T. D. Forsyth, D. W. Freshfield, Col. H. H. Godwin-Austen, Col. J. A. Grant, Major-General Sir W. H. R. Green, Major-General Sir J. F. Lefroy, Sir W. L. Merewether, Admiral Sir E. Ommanney, Col. Sir L. Pelly, Lieut.-General Sir A. Phayre. Sir R. W. Rawson, Major-General C. P. Rigby, S. W. Silver, General R. Strachey, Major-General Sir H. L. Thuillier, and Sir H. C. Verney.

JUNE 9TH.—Right Hon. the Earl of Northbrook, President, in the chair.—The following gentlemen were elected Fellows: Capt. W. M'Clintock, Messrs. G. L. Ansted, F. C. D. Haggard, T. Harris, L. Hart, R. Kell, J. W. Laing, E. W. Lewis, V. E. Older, J. Paddon, E. Rimmel, and C. Williams. The lecture read was "On the Origin of the Flora of the European Alps," by Mr. J. Ball.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

MAY 21ST.—Mr. S. Cuming in the chair.—Some paintings copied from the rood screen of Westhall Church, Suffolk, were exhibited by Mr. Watling. This screen has a remarkable series of figures of apostles and saints, each with his proper emblem, and of fifteenth century work. Mr. C. Brent exhibited a small cylinder of Assyrian date, the inscription upon which was rendered by Mr. de Gray Birch. Mr. Morgan described a Spanish figure of the Virgin Mary, which is said by tradition to have been carried by the Christians before their armies during the Moorish wars. It is about eighteen inches in height and is admirably carved. Mr. L. Brock described a series of fragments of Samian ware recently found in excavations near the Bank. They are for the most part ornamented, and are remarkable for showing traces of some great fire in remote times, many being burned black, a peculiarity which has frequently been met with in other parts of London. The first paper was by Mr. W. G. Fretton "On the Antiquarian Losses in Coventry during the last 150 Years." The history and position of all the ancient buildings of the city which have been demolished during that period were passed in review, and the circumstances of their removal were dwelt upon. Their demolition was occasioned for the most part by the indifference of their custodians, who appear to have had no interest in them as examples of art. A similar record might be made of almost every other ancient town in the country. The loss of the beautiful Market Cross and of the town gates was especially dwelt upon. The restoration of the churches has resulted in several ancient features being brought to light, but much unnecessary "newness" has been given to these buildings. In the discussion which followed, the principle of removing the work of the last 200 years in so called restoration was condemned by several speakers. Such work was evidence of the history of the buildings as well as the features of older date, and should be retained. The second paper was by Mr. Pinches, who described the remarkable bronze gates recently brought to light by Mr. Rassam at Belawat, nine miles from Nimroud. The circumstances of the discovery, the position, and the whole series of the figures on the bronze plates were passed in review in an exhaustive manner, and were illustrated by several admirable photographs. The so-called Greek figures were referred to and the peculiarities of the armour pointed out.

JUNE 4TH.—Mr. S. Cuming in the chair.—It was announced that Lord Waveney had been elected President for the year, and that the Congress had been fixed to commence on the 14th of August at Great Yarmouth, ending at Norwich on the 20th. A large number of antiquities were exhibited, including some interesting Roman remains from Southwark by Mr. Way, a gilt crucifix discovered in the City by the Rev. S. M. Mayhew, and a perfect Norman jug from Cheapside by Mr. L. Brock. It was ornamented by bold diagonal lines and flowers laid on in slip. The first paper was by the Chairman, who described one of the figures on a richly ornamented chasuble of the close of the fifteenth century, found in a walled-up crypt beneath Werrington Church. The figure represented "St." Thomas, Earl of Lancaster, beheaded at Pontefract 1322, after being taken prisoner by the Royalists. He is represented in armour of the period and with a battle-axe. In the northern counties he was considered to be a martyr to the public cause and was called a saint, pilgrimages were made to the hill on which he suffered, and a particular office of mass was drawn up for the celebration of his festival. The second paper was by Mr. C. H. Compton, and descriptive of the Company of Horners of the City of London, a company which, instead of being extinct, as has been said on high authority, is still extant. The antiquity of the craft was referred to, and it was shown that horners were classed among the eight mysteries of the City, *temp.* Edw. III., but the company was not incorporated until 1641. It ceased to be a trading company between the years 1745 and 1796. It never possessed a hall, although it is authorised to build one. Its livery is limited to sixty, but between 1308 and 1833 only four members were admitted. Some deeds of the time of Elizabeth and articles of horn were exhibited. The concluding paper was by Mr. J. T. Irvine, who described the results of a journey made along the course of the Wansdyke from Bishop's Canning in the direction of Bath. The earthworks are, in places, remarkably perfect, showing a high bank with a deep, narrow ditch, so narrow, in fact, as to disprove the theory that it could ever have been used, in part of its course, for the main Roman road to Bath.

ROYAL SOCIETY OF LITERATURE.

May 21st.—Sir P. de Colquhoun, V.P., in the chair.—Sir P. de Colquhoun read a paper "On the Authorship of Shakspeare's Dramas."

ARCHÆOLOGICAL INSTITUTE.

June 5th.—Lord Talbot de Malahide, President, in the chair.—Dr. Schliemann sent a paper descriptive of his recent discoveries at Troy, by which it appears that the treasures on that spot are now well nigh exhausted. However, working in conjunction with Prof. Virchow, he found many gold and silver objects, including discs, idols, beads, and bracelets of gold and silver, a remarkable silver spoon, and a quantity of small figures of animals in clay. Dr. Schliemann gives his theory of the construction of the houses with floors laid with rough beams covered over with *débris* mixed with clay. Mr. J. H. Parker made some observations on the architectural history of the church of St. Denis, one of the turning points in the history of architecture. The early Gothic at St. Denis and Lincoln were treated of at some length, Mr. Parker asserting that the choir of St. Hugh at Lincoln, and not the church of St. Denis, is the earliest pure Gothic building in the world. Mr. G. T. Clarke spoke on the gradual growth of architecture in France and Ireland as contrasted with that in England. On the Continent each style was the legitimate successor to its predecessor, whereas in England the Conquest wrought a sudden and complete change of style. Mr. S. Clarke read a report on the Market House at Rothwell in Northamptonshire. This building, erected in 1577 by Thomas Tresham, the grandfather of the conspirator, exhibits on its walls upwards of ninety shields of arms of the county families, a veritable roll of arms in stone, and, in consideration of its historical intest and its dilapidated condition, the Institute has initiated a movement for its preservation from further decay. Mr. Baylis, Q.C., exhibited a short sword with studded ivory haft found at Roman's Castle, Raife. This was, perhaps, a *couteau de chasse, temp.* William III., but its resemblance to a plug bayonet was remarkable. Mr. R. S. Ferguson exhibited a miscellaneous collection of objects, including two sixteenth century racing bells of globular form, one of them inscribed, "THE SWEFTEST HORSE THES BEL TO TAK FOR MI LADE DAKER SAKE;" the iron skeletons of three short maces, bearing at the lower ends the arms of France and England, quarterly on silver escutcheons, probably of the time of James I.; a gold ring of peculiar character found near Carlisle, and said by Mr. P. Smith to be Indian. Capt. E. Hoare sent a large silver official seal of a priest of the Mohammedan church, decorated with the Arabian honeysuckle, and weighing 18 dwt. 15 gr. The Arabic inscription, as translated by Mr. Read, is, "The servant of the exalted place in God, Mir Ben Mogni." Mr. R. H. S. Smith a silver case of ancient Indian work containing a large and perfect "God stone." Dr. R. Fairbank communicated the discovery of a large Roman urn, of black earthenware and of a special type, lately found at Doncaster.—Mr. J. Nightingale sent a silver medallion of William and Mary.

MICROSCOPICAL SOCIETY.

May 14th.—Dr. Beale, President, in the chair.—Five new Fellows were elected. The following papers were read: "On the Occurrence of Recent Heteropora," by Mr. A. W. Waters; "On a New Species of Cothurnia," by Mr. J. Davis; and "On Homogeneous Immersion Objectives," by Mr. Wenham.

METEOROLOGICAL SOCIETY.

May 21st.—Mr. Greaves, President, in the chair.—The following gentlemen were elected Fellows: Messrs. A. C. Bamlett, C. Browne, H. Burkinyoung, W. Radford, and F. Ramsbotham. The adjourned discussion on the Rev. W. Clement Ley's paper "On the inclination of the Axes of Cyclones" was concluded. The object of this paper is to call attention to the evidence recently afforded by the results of mountain observation to the theory that "the axis of a cyclone inclines backwards." The author first reviews the state of the question up to the present time, and details his own investigations, chiefly founded upon the movement of cirrus clouds; he then refers to Prof. Loomis's recent "Contributions to Meteorology," in which are discussed the observations at the summits and bases of several high mountains, the results of which confirm the theory that the axis of a cyclone inclines backwards. The following papers were read: "On Observation of the Velocity of the Wind and on Anemometers," by Mr. G. A. Hagemann; and "On the Relation between the Height of the Barometer and the Amount of Cloud, as Observed at the Kew Observatory," by Mr. G. M. Whipple.

PHILOLOGICAL SOCIETY.

May 23rd.—Dr. Murray, President, in the chair.—Mr. Hyde Clarke read a paper "On the Comparative Philology of Etruscan, Lydian, Carian, &c., in continuation of his researches. He now confirmed his proposition of the relationship of these languages to each other, to the Akkad of Babylonia, and to the Georgian languages. He stated they are to be affiliated on a class or family consisting of several groups, to which he gave provisionally the name of Turano-African. In this, among dead languages, he further included the Phrygian and Thracian, the Canaanite, and the Egyptian (and Coptic). Among living languages were embraced Basque, Ugro Altaic, Georgian, and others of Caucasia, Naga, Kolarian, and other Indian languages, and the Japanese. He particularly pointed to the African members, embracing Bornu, Pulo or Fulah, Mandenga, Houssa, Timbuktu, &c. In North America many languages belonged to the class, and prominently the Pomo and Hidatsa, in Central America the Maya, and in South America the Peruvian languages. From original causes one member or group of languages more or less differs from another, but when compared with the whole class their affinity is established. It thus becomes possible to deal with the limited numbers of Etruscan words recorded by classic writers and by the mythologist, and while the meanings assigned were confirmed the affiliation was thereby established, and the community of all the languages of early culture displayed. The author illustrated the relation of the first personal Mi, on which so much controversy has been bestowed. The Prisco-Romans and Latins he affirmed to belong to the same class, as also the Præhellenes. The nomenclature of the towns he had before shown to be common to the ancient world, and it was still preserved in Central Africa. The mythology he traced to a common origin still affecting Africa and its fetishism, and existing in Central America. He explains the resemblance which had been observed between Etruscan and Norse mythology by this common Turanian influence. The Etruscans and the others he assigned to a white race descending from High Africa founding the empires of early culture, and displaced in the north by the white Semites and Aryans, in Africa and India by blacks, and in America by brown or red men. The paper was illustrated by copious comparative vocabularies of the languages referred to.

QUEKETT MICROSCOPICAL SOCIETY.

May 23rd.—C. Stewart, Esq., V.P., in the chair. Twenty new members were elected. The optical principles and construction of the micro-megascope, as devised by Dr. Matthews, were described by Mr. J. E. Ingpen, who illustrated his remarks by drawings and by the exhibition of the apparatus. Mr. Rolfe read a paper "On a New Microscopical Turntable," which he exhibited in the room; its merits were freely discussed, and another ingenious form of turntable, received from America, was also placed in the hands of the members for examination by Mr. F. Crisp. Mr. J. W. Groves read an interesting and exhaustive paper "On Stained Sections of Animal Tissues, and how to make them," the processes of preserving, hardening, section cutting, staining, and mounting being severally dealt with. A discussion followed, in which Messrs. White, Death, Stewart, and Dr. Matthews took part.

SOCIETY OF ENGINEERS.

June 9th.—Mr. R. P. Spice, President, in the chair.—The following gentlemen were elected—as members, Messrs. T. Roberts, Mr. T. H. Hovenden, and Mr. A. Comber; as Associates, Messrs. G. Lowthian and Mr. E. Alldridge. The paper read was by Mr. C. J. Alford "On the Mineralogy of the Island of Sardinia,"

MINERALOGICAL SOCIETY.

June 3rd.—Prof. T. G. Bonney in the chair.—The election of fourteen Corresponding Members, eight ordinary Members, and two Associates was notified. The following papers were read: "On Abriachanite, a new Scottish Mineral," by Prof. M. F. Heddle and Dr. W. H. Aitken; "On Haughtonite, a new Mica," and "On Bhreekite and Xantholite from Scotland," by Prof. M. F. Heddle; "On Christophite from St. Agnes, Cornwall," by Mr. J. H. Collins; "Minerals from Japan," by Mr. J. Milne; "On some Gold Occurrences," by the Rev. J. C. Ward; "Additional Note on Penwithite," by Mr. J. H. Collins; and "Measurements of Angles of the Basaltic Columns at the Giant's Causeway," by Profs. Jellett and O'Reilly.

CHEMICAL SOCIETY.

June 5th.—Mr. Warren De La Rue, President, in the chair.—It was announced that a ballot for the election of Fellows would be held at the next meeting (June 19th). The following papers were read: "A Contribution to the Theory of Fractional Distillation," by Dr. T. E. Thorpe. The author has observed that of a mixture of equal volumes of carbon tetrachloride, b.p. 76°·6, and of methyl-alcohol, b.p. 65°·2, 46·5 per cent of the whole distils over at 55°·6-55°·9, 10° lower than the boiling-point of its more volatile constituent. "Preliminary Note on the Action of Organo-zinc Compounds on Quinones," by Dr. F. R. Japp. The author has studied the action of zinc ethyl on phenanthrene quinone and obtained a substance crystallising in faintly yellowish plates, having the composition—

$$C_{16}H_{14}O_2C_2H_6O;$$

he hopes by these reactions to distinguish quinones from double ketones.—"Third Report to the Chemical Society on Researches on some Points in Chemical Dynamics," by Dr. Wright and Messrs. Luff and Rennie. "On Fractional Distillation," by

Mr. F. D. Brown. The author has studied with great care the distillation of mixtures of benzene and carbon disulphide. "On Chlorstannic Acid," by Mr. J. W. Mallet. "On Indigopurpurin and Indirubin," by Mr. E. Schunck. Baeyer and Emmerling obtained a red colouring matter from isatin, which they named indigopurpurin; this is identical with indirubin, obtained by the author from indican; the author considers that the name indigopurpurin should be abolished.

JAPANESE MIRRORS.

MR. R. W. Atkinson, of the University of Tokio, Japan, communicates to *Nature* the following interesting account of these curious mirrors:—

A short time ago a friend showed me a curious effect, which I had previously heard of, but had never seen. The ladies of Japan use, in making their toilet, a small round mirror about 1-12 to $\frac{1}{8}$ inch in thickness, made of a kind of speculum metal, brightly polished and coated with mercury. At the back there are usually various devices, Japanese or Chinese written characters, badges, &c., standing out in strong relief, and brightly polished like the front surface. Now, if the direct rays of the sun are allowed to fall upon the front of the mirror, and are then reflected on to a screen, in a great many cases, though not in all, the figures at the back will appear to shine through the substance of the mirror as bright lines upon a moderately bright ground.

I have since tried several mirrors as sold in the shops, and in most cases the appearance described has been observed with more or less distinctness.

I have been unable to find a satisfactory explanation of this fact, but on considering the mode of manufacture I was led to suppose that the pressure to which the mirror was subjected during polishing, and which is greatest on the parts in relief, was concerned in the production of the figures. On putting this to the test by rubbing the back of the mirror with a blunt pointed instrument, and permitting the rays of the sun to be reflected from the front surface, a bright line appeared in the image corresponding to the position of the part rubbed. This experiment is quite easy to repeat; a scratch with a knife or with any other hard body is sufficient. It would seem as if the pressure upon the back during polishing caused some change in the reflecting surface corresponding to the raised parts, whereby the amount of light reflected was greater; or supposing that, of the light which falls upon the surface, a part is absorbed and the rest reflected, those parts corresponding to the raised portions on the back are altered by the pressure in such a way that less is absorbed, and therefore a bright image appears. This, of course, is not an explanation of the phenomenon, but I put it forward as perhaps indicating the direction in which a true explanation may be looked for.

The following account of the manufacture of the Japanese mirrors is taken from a paper by Dr. Geerts, read before the Asiatic Society of Japan, and appearing in their *Transactions* for 1875-76, p. 39:—

"For preparing the mould, which consists of two halves, put together with their concave surfaces, the workman first powders a kind of rough plastic clay, and mixes this with levigated powder of a blackish 'tuff-stone' and a little charcoal powder and water till the paste is plastic and suitable for being moulded. It is then roughly formed by the aid of a wooden frame into square or round cakes; the surface of the latter is covered with a levigated half-liquid mixture of powdered *chamotte* (old crucibles which have served for melting bronze or copper) and water. Thus well prepared, the blackish paste in the frame receives the concave designs by the aid of woodcuts, cut in relief. The two halves of the mould are put together in the frame and dried. Several of these flat moulds are then placed in a melting box made of clay and *chamotte*. This box has on the top an opening into which the liquid bronze is poured, after it has been melted in small fireproof clay crucibles. The liquid metal naturally fills all openings inside the box, and consequently also the cavities of the moulds. For mirrors of first quality the following metal mixture is used in one of the largest mirror foundries in Kiôto:—

Lead	5	parts.
Tin	15	„
Copper	80	„
	100	

For mirrors of inferior quality are taken:—

Lead	10	parts.
Natural sulphide of lead and antimony	10	„
Copper	80	„
	100	

"After being cooled the melting box and moulds are crushed and the mirrors taken away. These are then cut, scoured, and filed until the mirror is roughly finished. They are then first polished with a polishing powder called *to-no-ki*, which consists of the levigated powder of a soft kind of whetstone (*to-ishi*), found in Yamato and many other places. Secondly, the mirrors are polished with a piece of charcoal and water, the charcoal of the wood *ho-no-ki* (*Magnolia hypoleuca*) being preferred as the best for the purpose. When the surface of the mirror is well polished it is covered with a layer of mercury amalgam, consisting of quicksilver, tin, and a little lead. The amalgam is rubbed vigorously with a piece of soft leather, which manipulation must be continued for a long time until the excess of mercury is expelled and the mirror has got a fine, bright, reflecting surface."

Professors Ayrton and Perry give the following explanation of the phenomena of the Japanese mirror:—

"The magic of this Eastern mirror arises not, as has been supposed, from a subtle trick on the part of the maker, nor from inlaying of other metals, nor from hardening of portions by stamping; but from the natural property possessed by certain thin bronze of buckling under a bending stress so as to remain strained in the opposite direction after the stress is removed. And this stress is applied partly by the *megebo*, or 'distorting rod,' and partly by the subsequent polishing, which in an exactly similar way tends to make the thinner parts more convex than the thicker."

FOREIGN SCIENCE.

THE annual report of the North of Paris Tramway Company, lately presented to the shareholders, contains some information worthy of attention, particularly the statements which it contains respecting the substitution of mechanical for horse power for their vehicles. The change appears to have had the effect of augmenting their traffic during the past year to a great extent, the receipts being more than fifty thousand francs in advance of the previous year.

Some notes by M. Radonant, chemical engineer, of Paris, on the new system of nickelizing metallic articles such as reflectors, &c., invented by Dr. Adams, of Boston, appear in a recent number of our contemporary *Les Mondes*. Two of the principal features in the new method are the obtaining of nickel perfectly pure, and a new mechanical process for polishing metals after same has been applied. Considerable difficulty has been generally experienced in attaining the first of these objects.

A method of subduing restive horses by electricity, which was exhibited in the Exposition Universelle, has been successfully employed by the omnibus proprietors in Paris. It is extremely simple in its action, and the whole of the apparatus required can be contained in a box or case not more than twelve centimetres in length. Some experiments have been recently made in France to ascertain the power of different types of electrical machines in transmitting and distributing work to a distance and to different places. In using two Gramme machines, one was caused to produce electricity by means of mechanical work, the second machine to do the opposite, thereby restoring the work. M. Tresca has published full particulars of one of these experiments just completed at Serunaize, where a Gramme machine, being driven by a steam-engine at the rate of 1200 revolutions per minute, was connected by a cable or wire with another Gramme machine, placed at a distance of about 400 metres, and with a third machine of the same kind at a distance of 700 metres. A commutator placed in the circuit enabled the current to be directed for working either of the machines as desired. The two secondary machines were caused to actuate drums having cables surrounding them, whereby ploughs were drawn along a field, an effective force of three-horse power being obtained. The machine first actuated by the current made 1,123 revolutions per minute, and the second 890. The machines were mounted on suitable carriages, which could also be moved by means of the current.

Among the recent publications of Paris firms, a new work by Madame J. Lebreton on Botany is worthy of attention.

WISHES.

AH! were I but a star, I'd bide
Where e'er I saw you walk in pride,
Yet, when you watched we, waning hide.
Ah, would I not!

Were I a flower, without a fear
I'd bloom more brightly were you near;
Yet tremble, so your heart might hear:
Ah, would I not!

Were I the wind, which loves to tread
With measured song high overhead,
I'd wail, till you soared where I led.
Ah, would I not!

Were I a cloud, I'd send you shade
When the hot sun made blossoms fade;
And on thy brow his fervour played:
Ah, would I not!

Were I a maiden, bright and young,
I'd smile, and sing the song you sung;
Till you should all to me belong:
Ah, would I not!

Were I a woman, proudly fair,
I'd love your grace, your chestnut hair;
And if you lov'd not,—weep, despair:
Ah, would I not!

Were I an angel, o'er your head;
I'd waft each blessing Allah shed,
And love you when all bliss had fled:
Ah, would I not!

V. GONVILLE.

THE INTERNATIONAL EXHIBITION OF THE ROYAL AGRICULTURAL SOCIETY AT KILBURN has boen opened just as we go to press. We cannot, therefore, do more than state that it seems to be well worthy of inspection. We are much pleased to observe that many Members of the Inventors' Institute are noteworthy exhibitors. Mr. G. E. Pritchett (Stand 680) shows various applications of his hollow brick and tile ware, &c.; Messrs. Legrand and Sutcliffe (Stand 439) pumps, well-driving apparatus, and other articles; Messrs. Fairholme (Stand 248) exhibit various important inventions; and Mr. C. Hopkinson (Stand 430) shows his valuable improvements in flour-dressing, &c We hope to give a fuller notice next month.

THE INVENTORS' INSTITUTE.

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3rd. To facilitate the diffusion of information with reference to Inventions, and other subjects beneficial to Inventors and Patentees.

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